

# Engineering Annual Report for Assessment of Outcomes

*Submitted:* June 2011

SAC: ENGR: Engineering Transfer

Outcomes Assessed: Communication

1. Describe changes that have been implemented towards improving students' attainment of outcomes that resulted from outcome assessments carried out in the previous academic year.

*(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)*

N/A

2. Identify the outcomes assessed this year, and describe the methods used. What were the results of the assessment (i.e., what did you learn about how well students are meeting the outcomes)?.

*(information provided here may be referenced, inserted into or summarized in Program Review 2.C.i& ii (for Core Outcomes) or 6.B.i & ii (for CTE Degree and Certificate outcomes)*

**a. Describe the method(s) you used.**

In the Electric Circuits II course (ENGR 222), students write lab reports. Among others, there are the following required sections in the reports: Introduction, Experimental Procedure, Conclusions, and Spelling/Grammar/Sentence structure.

When the lab reports are graded, a rubric is used to assess the students' work in these areas. Scores can range from 1-4, with 1 being "Beginning or Incomplete" and 4 being "Exemplary."

Student scores on their lab reports for the above-mentioned criteria were use for the assessment of the Communication Outcome.

**b. Results: What did you learn?**

The overall average score for the selected lab report sections was 2.78. Average scores for individual sections ranged from 2.65 to 2.85.

For each report section assessed, the students' scores ranged from 1 to 4. This confirms that some students arrive in our classes with very good written communication skills, where others arrive with skills that need much improvement.

These results were disappointing; our hope was that averages would exceed 3 (3 = "Accomplished"). Our students are not gaining the technical proficiency in writing that we would like them to have.

3. Identify any changes that should, as a result of this assessment, be implemented towards improving students' attainment of degree and certificate outcomes.

*(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)*

Emphasize the importance of effective communication skills in all our courses, whenever we can. Students often underestimate the importance of these skills, believing that engineers only need to be competent on the technical side.

Many students received low marks for spelling and grammar. We feel that, with the tools now available to students (spell checkers, etc.), this simply represents a lack of pride in their work. Instructors should emphasize the importance of professionalism and pride in all of the students' work.

Consider adopting a prerequisite of WR 121 for all second-year ENGR courses. The ENGR 101 course requires, at minimum, concurrent registration in WR 115. Other ENGR courses do not have a writing prerequisite beyond this level.

Engineering courses are, of course, technical in nature, and there is often little time in these courses to infuse much writing. However, we should explore ways to include some writing in our courses that are traditionally exclusively calculation-based.

# Engineering Annual Report for Assessment of Outcomes

*Submitted:* June 2011

SAC: ENGR: Engineering Transfer

Outcomes Assessed: Critical Thinking

1. Describe changes that have been implemented towards improving students' attainment of outcomes that resulted from outcome assessments carried out in the previous academic year.

*(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)*

N/A

2. Identify the outcomes assessed this year, and describe the methods used. What were the results of the assessment (i.e., what did you learn about how well students are meeting the outcomes)?.

*(information provided here may be referenced, inserted into or summarized in Program Review 2.C.i& ii (for Core Outcomes) or 6.B.i & ii (for CTE Degree and Certificate outcomes)*

**a. Describe the method(s) you used.**

In ENGR 221 all students are given a laboratory final. In this final students are asked to rebuild a circuit from a previous experiment. The student is responsible for determining when the data from the final is complete and correct. This requires them to analyze their previous experiment and duplicate its results. Students are expected to take measurements and reason/troubleshoot until their previous results are duplicated.

Once the results are correct the student must demonstrate the measurement technique to the instructor. The student must also demonstrate that he/she has evaluated the new data and that it is correct. This is demonstrated by orally comparing previously taken data with the current data. Proof must be given that the student knows what the previous data is, i.e. data table in lab notebook. Students are asked questions such as "How do you know this is correct?" in the post-lab interview with the instructor.

In Fall of 2010, 33 students were assessed in this method.

**b. Results: What did you learn?**

The average grade on the final was 93%, the high was 95%, and the low was 70%. All but 4 of the students received an 'A' on the final. This shows that our students have learned to critically evaluate lab data and understand when it is correct.

The lab final is designed to assess our student's base level critical thinking; as so, it is given with the expectation that students will do very well.

3. Identify any changes that should, as a result of this assessment, be implemented towards improving students' attainment of degree and certificate outcomes.

*(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)*

This assessment demonstrates that our students are achieving a base level of critical thinking. It may be useful to determine the degree to which our students are achieving higher levels of critical thinking. This will require a more robust assessment method or a change to the lab final in ENGR 221. The lab final can easily be made more critical-thinking based simply asking deeper questions and requiring students to explain the theory of operation of the circuits.

# Engineering Annual Report for Assessment of Outcomes

*Submitted:* June 2011

SAC: ENGR: Engineering Transfer

Outcomes Assessed: Professional Competency

1. Describe changes that have been implemented towards improving students' attainment of outcomes that resulted from outcome assessments carried out in the previous academic year.

*(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)*

N/A

2. Identify the outcomes assessed this year, and describe the methods used. What were the results of the assessment (i.e., what did you learn about how well students are meeting the outcomes)?.

*(information provided here may be referenced, inserted into or summarized in Program Review 2.C.i& ii (for Core Outcomes) or 6.B.i & ii (for CTE Degree and Certificate outcomes)*

## **a. Describe the method(s) you used.**

Students entering the ENGR program often erroneously equate getting the "right answer" with professional competency. In reality, using accepted problem-solving methods and communication standards (formats) is equally important.

In ENGR 101, students are taught basic engineering processes of problem solving. In order to pass the homework portion of the class, the student must use basic engineering problem-solving methodologies. Homework assignments are evaluated on the use of proper professional methodology and on the use of the industry-standard solution format. By analyzing the homework grades we are able to see progress in professionalism and documentation of proper methodology.

The homework scores of 14 students from the fall of 2010 were analyzed.

## **b. Results: What did you learn?**

The overall average for the class was 66%. It was observed that many of the students had simply not done some of the homework assignments. If these missing assignments are thrown out of the evaluation, then average jumps up to 85%. This shows that when students actually take the time to perform the assignment they are following proper methodology and standard format. The problem is that many are not taking the time to complete the assignments.

3. Identify any changes that should, as a result of this assessment, be implemented towards improving students' attainment of degree and certificate outcomes.

*(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)*

Students seem to resist having to follow a prescribed method and format to homework. This often manifests itself as simply not doing the homework when they get busy. We need to work on emphasizing that these professional methodologies and formats are critical if their work is to be perceived as professional in the workplace. While the format may seem cumbersome, the skills learned in following the proper format will be used in the workplace.

These changes can be accomplished by faculty by explaining this to students at the start of class. It will also help to give feedback using the key word "Professional." Instructors should also explain how the format can be used as an aid to study or give examples of how it is used in the real world.